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How should we respond to cannabis-impaired driving?

Cannabis is the most widely used illicit drug in many high and middle income countries [1-4] and one that is often used by young adults in the age group 18-25 years who are at highest risk of being in motor vehicle accidents [5]. The policy question is: How best to respond to the road safety issue posed by cannabis? This was addressed at the Third International Symposium on Drug-Impaired Driving in Lisbon in October 2017, jointly convened by the European Monitoring Centre for Drugs and Drug Addiction, the Canadian Centre for Substance Abuse Research, the US National Institute on Drug Abuse, and the New Zealand Drug Foundation [6]. The following is a summary of some key points I gleaned from that meeting in my role as meeting rapporteur.

Cannabis intoxication impairs performance in driving simulators and in on road driving studies [5]. Meta-analyses of epidemiological studies of biological indicators of cannabis and other drugs in the blood and urine of injured drivers and car crash fatalities suggest that recent cannabis use increases the risks of an accident from 1.5-2.0 times [7,8]. This risk may be under-estimated because there is a poor correlation between cannabis levels in blood and driver impairment [9].

The proportion of fatalities attributed to cannabis has been much smaller than that attributable to alcohol for two main reasons: the relative risk of having an accident is much smaller for cannabis-impaired than for alcohol-impaired drivers [10,11]; and the prevalence of cannabis-impaired driving is much lower than that of alcohol-impaired driving. Both of these conditions could change as a result of cannabis legalisation if current users used cannabis more frequently and/or there were more users of more potent cannabis who drive after using it [12].

The public in countries where cannabis use is common among youth tends to see its widespread use as requiring some response to protect the community health and safety [13]. It is not surprising then that US jurisdictions that have legalised recreational cannabis use have prohibited cannabis-impaired driving [14] and that Canada is proposing to increase enforcement of its laws after it legalises cannabis in 2018.

As the meeting made clear, the major policy challenge has been to find effective ways to enforce laws against cannabis-impaired driving. The approach pioneered in Australia in the early 2000s was to adapt policies that had reduced alcohol-impaired driving, namely: roadside testing of blood alcohol level; a confirmatory blood alcohol concentration (BAC) when the breath test is positive; and use of a per se definition of alcohol-impaired driving based on % blood alcohol concentration (BAC). A similar approach to cannabis-impaired driving seemed simple and practicable to implement and likely to be seen as effective and fair by the public.

The major problem in applying this approach to cannabis-impaired driving has been the absence of any equivalent to alcohol breath tests as a marker of driver impairment. The

pharmacologies of alcohol and cannabis are very different [11,15]. Alcohol-impaired driving increases with increasing BAC but blood THC is not as directly related to driver impairment. Blood THC levels increase steeply when cannabis is smoked but fall rapidly as cannabis-related impairment increases [11]. Because it is fat soluble THC can be detected at low levels in blood long after cannabis-related driving impairment has disappeared [15].

Policy makers have not waited for researchers to provide better biological definitions of cannabis-impaired driving. They have instead adopted a policy compromise that aims to discourage cannabis-impaired driving by testing recent cannabis use in a way that is practical for police to implement and publicly acceptable, even if it has a weak scientific rationale. Policy makers seem to have made the reasonable assumption that educating cannabis users about the risks of driving and exhorting them not to drive is unlikely to be effective in the absence of a credible policy that punishes cannabis-impaired drivers.

A common approach to laws against cannabis-impaired driving have been adopted in a number of countries following Australia's example, such as, Ireland [16], the Netherlands [17], Norway [18], the United Kingdom [19] and the United States [20,21]. These countries use oral fluid testing to identify drivers who have recently used cannabis and measure THC in blood if they fail the oral fluid test. The second change has been to define cannabis-impaired driving as driving with higher than a legally specified level of THC in the blood that has often been set at the level of detection of the test, i.e. between 1 and 2 nanograms of THC per millilitre of blood in Australia [22], Norway [18] and the United Kingdom [19]. A higher level of 5 nanograms per millilitre has been set in US states that have legalised cannabis [14].

Critics of this approach have argued that these per se THC levels in blood do not measure impairment [11] and are designed to discourage cannabis use rather than to protect public safety [13]. The commonly used levels do indeed have a weak pharmacological and epidemiological rationale for the reasons outlined above [11].

What was very clear from the meeting is that we still do not know whether these policies are effective in deterring cannabis users from driving when intoxicated. Roadside drug testing has operated in Australia since 2002 but evaluations of its effectiveness have been largely limited to studies of enforcement activity [13,22]. Testing programs have only been in operation for a few years in Europe and US states that have legalised recreational cannabis use. As a result, studies have typically reported on the numbers of drivers who: were tested; tested positive; and were convicted of drug-impaired driving (e.g. [3,20,21,23]). There have been no evaluations of the impact of these policies on perceived risks of detection or on rates of drug-impaired driving.

The meeting suggested that a high priority for research should be more rigorous evaluations of the effects of drug testing on: road fatalities and injuries in which alcohol, cannabis and other drugs are detected post-mortem; changes in public attitudes towards the

acceptability of driving after using cannabis; and changes in cannabis users' perceived risks of being detected if they drive after using cannabis. We also need to evaluate the cost effectiveness of these policies (e.g. [3]) and the opportunity costs of focusing limited police resources on enforcing laws against cannabis-impaired driving when alcohol-impaired driving remains a much larger public health problem [3].

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